

## HYPOTHESIS TESTING QUIZ Solution

Test, at the  $\alpha = 0.05$  level, the following hypothesis. Write out each step as clearly as possible.

Obesity in pets is becoming a common problem in America, compromising the health and longevity of both dogs and cats. A new lighter formulation for a dog food is being tested for efficacy. A control group, consisting of 25 large-breed dogs, is being fed the old formulation. A test group, also consisting of 25 large-breed dogs, is being fed the lighter formulation. The following data on weight is collected:

Control:  $\bar{x} = 150.7$  kg,  $s = 22.7$  kg,  $n = 25$

Test:  $\bar{x} = 135.2$  kg,  $s = 24.1$  kg,  $n = 25$

**ANSWER:**

**CLAIM:** The lighter dog food is effective for weight loss in large-breed dogs.

**HYPOTHESIS:**  $H_0: \mu_0 = \mu_1$  (alternatively,  $\mu_0 - \mu_1 = 0$ )

$H_1: \mu_0 > \mu_1$  (alternatively,  $\mu_0 - \mu_1 > 0$ ) Note: This is a one-tailed test. What we are looking for is weight loss in dogs. Certainly we'd care if the new formulation caused dogs to gain weight, but we don't need to test for that- if the data indicates a weight gain of any kind, it's back to reformulating the dog food. However, with a weight loss, we want to make sure a statistically significant effect is occurring.

**TEST:** This is a one-tailed T-test. We have our data gathered above, and both the Control and Test groups have 24 degrees of freedom.

**CRITICAL VALUE** is -2.06

**TEST VALUE** (evaluating using a TI calculator): - 2.34 (alternatively, P-value equals 0.01 and is less than 0.05)

Since our test value is less than our critical value (alternatively, our P-value is less than 0.05), then we can conclude that the data shows that the lighter dog food formulation does affect weight loss in larger dogs.